

Section 502(e) Guidance
Providing Credit Toward Energy Efficiency Goals for Cost-Effective Projects
Where Source Energy Use Declines But Site Energy Use Increases
(Amended October 1, 2004)

Background

Section 502(e) of Executive Order 13123 requires the Secretary of Energy to “issue guidance for providing credit toward energy efficiency goals for cost-effective projects where source energy use declines but site energy use increases.”

Section 206 of the Executive Order states:

Source Energy. The Federal Government shall strive to reduce total energy use and associated greenhouse gas and other air emissions, as measured at the source. To that end, agencies shall undertake life-cycle cost-effective projects in which source energy decreases, even if site energy use increases. In such cases, agencies will receive credit toward energy reduction goals through guidelines developed by DOE.

Energy measured at the point of use is termed “site energy.” Energy measurement that accounts for the generation, transmission and distribution of the energy is called “source energy.”

Whichever way consumption is measured, cost-effectiveness remains the mandated criteria for assessing, selecting, and funding potential Federal energy efficiency projects. In June 1996, the Federal Interagency Energy Policy Committee (656 Committee) unanimously approved a policy statement that encourages cost-effective energy projects that result in reduced energy consumption regardless of whether that consumption is measured on a site basis or source basis.

The Department of Energy’s *Annual Report to Congress on Federal Government Energy Management* will continue to report facility consumption both ways on an agency-wide basis and refers to source-measured energy as primary consumption and site-measured energy as net consumption. When tracking performance toward the mandated reduction goals for buildings and facilities, Btu per gross square foot will be measured on a site basis, while source-measured consumption is also reported in accompanying tables.

Agencies should continue to report energy consumption as in the past, i.e., aggregated and submitted in the following units for each energy type.

<i>Energy Type</i>	<i>Reporting Unit</i>	<i>Site Conversion Factor</i>
Electricity	(Megawatt Hours)	3,412 Btu/kilowatt hour
Fuel Oil	(Thousands of Gallons)	138,700 Btu/gallon
Natural Gas	(Thousand Cubic Feet)	1,031 Btu/cubic foot
LPG/Propane	(Thousands of Gallons)	95,500 Btu/gallon
Coal	(Short Ton)	24,580,000 Btu/short ton
Purchased Steam	(Billion Btu)	1,000 Btu/pound
Other	(Billion Btu)	

Based on these submissions DOE will calculate energy consumption in site-delivered Btu and Btu per gross square foot. DOE will also calculate Btu per gross square foot on a source basis.

Based on agency reporting for projects that reduce source energy use although site energy use increases, DOE will credit the source energy savings to the agency site energy use before the final calculation of goal performance in terms of site Btu per gross square foot.

Agencies may apply the credit themselves when reporting their performance to the Office of Management and Budget on their Agency Energy Scorecards.

Calculating Project-Specific Source Energy Reductions

Agencies can receive credit on their scorecard evaluations for life-cycle cost-effective projects where source energy declines and site energy increases. For each such completed project, agencies should calculate source energy savings for the reported fiscal year. Agencies may use the national average source conversion factors used by DOE or may choose factors for their state, utility, or steam provider. The national conversion factors used by DOE are:

Electricity	11,850 Btu/kilowatt hour
Purchased Steam	1,390 Btu/pound

The electricity conversion factor includes energy lost in the generation process (66.5%), electricity used in the utility plant (1.7%), electricity lost in the transmission and distribution process (3.0%), and electricity delivered to the customer's site (28.8%). If a project uses a different factor, the source and each of these components should be documented along with the corresponding project worksheet.

Agencies should use the following worksheet to document, for each applicable project, that source energy is reduced but site energy increases, and therefore the project qualifies for the Section 502(e) credit:

PROJECT WORKSHEET			EXAMPLE: XYZ
(Include ID of project and date completed)			Project aaa
Base Case (without Project)			
<i>Line 1</i>	Annual Source Energy Used	_____ MMBtu	<u>225,900 MMBtu</u>
<i>Line 2</i>	Annual Site Energy Used	_____ MMBtu	<u>107,770 MMBtu</u>
With Project			
<i>Line 3</i>	Annual Source Energy Used	_____ MMBtu	<u>178,800 MMBtu</u>
<i>Line 4</i>	Annual Site Energy Used After Project	_____ MMBtu	<u>128,170 MMBtu</u>
	<i>(subtract Line 3 from Line 1, this is:)</i>		
<i>Line 5</i>	Annual Source Energy Saved After Proj.	_____ MMBtu	<u>47,100 MMBtu</u>
	<i>(subtract Line 2 from Line 4, this is:)</i>		
<i>Line 6</i>	Annual Site Energy Increase After Proj.	_____ MMBtu	<u>20,400 MMBtu</u>

Qualifying projects receive a credit in the amount of the annual source energy savings (line 5 above), which is used to adjust downward the agency site energy use before the final calculation of goal performance in terms of site Btu per gross square foot. However, since qualifying projects have the characteristic that on-site utilization of energy forms other than electricity increase, while purchases of grid electricity are reduced; the agency's existing site energy use tracking system (e.g., the Defense Utility and Energy Reporting System for the Navy) will automatically recognize part of the credit. The purpose of the 502(e) adjustment is to account for the rest of the source energy savings credit.

For example, consider a large cogeneration (combined heat and power or CHP) project. Electricity is generated on-site with natural gas backed up with liquid fuel, and heat is recovered from the generation process and recycled to reduce purchases of boiler fuels, and/or to generate chilled water, further reducing grid electricity purchases. As a result of the project, fuel use for on-site power generation increases, fuel use for boilers decreases, and grid electricity purchases decrease. Site Btu and source Btu are substantially identical for all energy forms impacted by the project except for grid electricity, where 1 kWh equals 11,850 source Btu (national average) but only 3,412 site Btu. With the exception of grid electricity, all forms of energy affected by the project have the same Btu value whether site or source. Therefore, backing out the grid electricity displaced by the project (self-generation, electric chiller load displaced by chilled water from recycled heat, etc.), on a source-Btu basis, is all that needs to be done. The agency's site energy tracking system will already have backed out displaced grid electricity because it no longer appears on the utility meter, but only at a rate of 3,412 Btu per kWh. An adjustment is needed to account for the rest of the source energy savings, at a rate of 8,438 Btu per kWh (11,850 minus 3,412). The 502(e) adjustment for the cogeneration project equals the displaced grid electricity in kWh per year multiplied by 8,438 Btu per kWh.

After calculating adjustments for each qualifying project, compile the data into the Compilation Worksheet format below:

AGENCY COMPILATION WORKSHEET: (Agency Name)				
	Name of Project	Annual Site Energy Increase with the Project (Project Worksheet Line 6) MMBtu	Annual Source Energy Saved with the Project (Project Worksheet Line 5) MMBtu	502(e) Adjustment to Annual Site Energy (Generally kWh of Grid Electricity Displaced Times 8,438Btu/kWh) MMBtu
1)				
2)				
3)				
	Totals			
Note: Credit is to be applied to <input type="checkbox"/> Sec 202 (buildings) or <input type="checkbox"/> Section 203 (industrial/lab)				

In the table above, the right hand column total will be subtracted from the agency's total site energy use for buildings subject to the Section 202 goal, or from the agency's total site energy use for industrial/lab areas subject to the Section 203 goal, whichever the case may be, before calculating site Btu-per-gross-square-foot.

Submission to DOE

Agencies should submit their Compilation Worksheets to DOE to assure that the adjusted site energy is documented. Project data should be submitted for Section 202 and Section 203 on separate forms. Agencies need to submit their compilation sheet(s) for each year of their projects' lives so they can continue to get credit for all operating projects completed in previous years.

Additional Benefits and Recognition of Projects that Reduce Source Energy

(1) Impact on Greenhouse Gas Reduction Goal: Progress toward the new greenhouse gas reduction goal will be calculated based on source-measured energy. Therefore, projects that result in source energy reductions will directly contribute to an agency's performance toward the greenhouse gas reduction goal of Section 201 of the Order.

(2) Reductions in Source Energy per Gross Square Foot: Agency progress toward energy reduction goals will be tracked in the *Annual Report to Congress on Federal Government Energy Management* on a source-measured basis as well as on a site-measured basis. This will highlight agency achievements in source energy reductions as directed under Section 206 of the Order.

Questions or suggestions regarding this guidance should be addressed to Rick Klimkos at FEMP, 202-586-8287, rick.klimkos@ee.doe.gov

[Note: This guidance will be incorporated into the annual DOE Reporting Guidance for the *Annual Report to Congress on Federal Government Energy Management*.]